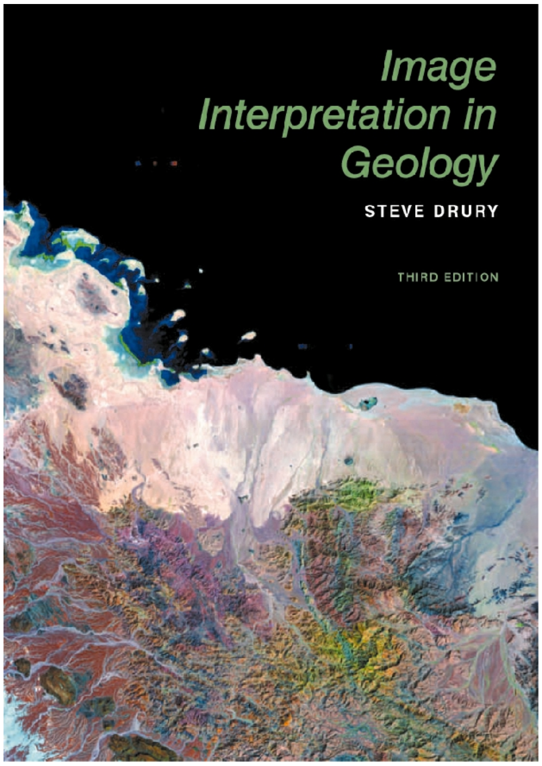
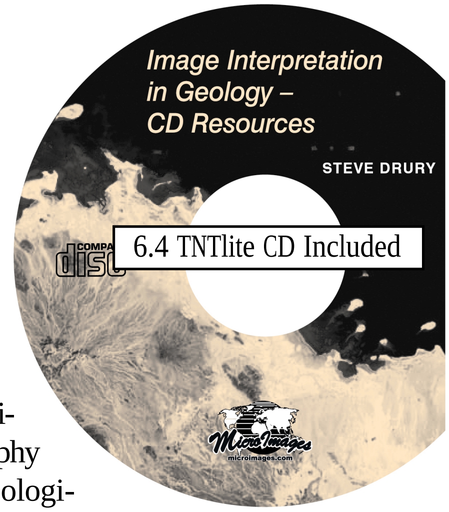
Image Interpretation In Geology Third Edition



304pp • US$74.95/UK£35 • 287 illustrations



Since the first edition in 1987, *Image Interpretation in Geology* by Dr. Steven Drury has established itself as essential reading for earth science, environmental science and physical geography students studying the geological applications of remote sensing and image interpretation.

The new Third Edition of this book describes the fundamentals of remote data capture and image processing, their practical limitations, and new techniques such as digital radar imaging and hyperspectral data analysis. Geological applications such as mapping, mineral exploration, and geohazards are illustrated by numerous black-and-white photographs and a color plate section.

New to the Third Edition is a CD-ROM (combined Mac and PC format) which contains an image gallery (with accompanying spectacles for viewing in 3-D), exercises, and TNTlite 6.4. This software, a fully-functional version of MicroImages Inc's TNTmips 6.4, encourages students to experience at first-hand the immense power of modern image processing and interpretation software, and allows lecturers to use a wide range of sample data and practical exercises to support their courses.

Contents

- CD ROM which allows students a huge range of examples.
- TNTlite software - give students the chance to use real image interpretation software.
- Stereo specs with CD ROM - students will see images in stereo without needing to go to the lab to use the old-fashioned stereoscopes.

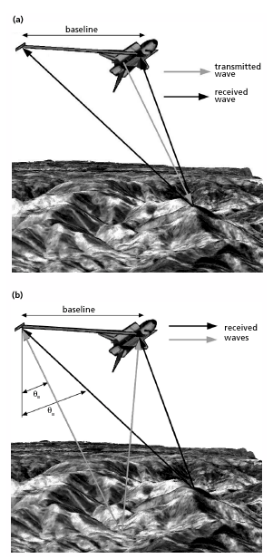
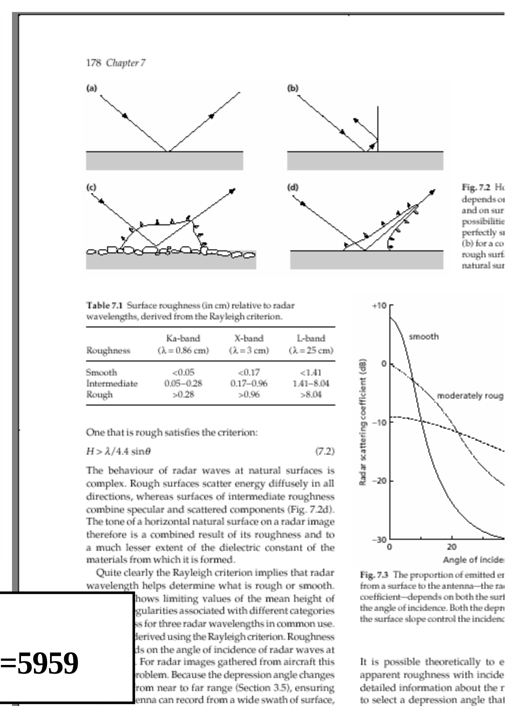


Fig. 7.27 (a) Antennas for fixed baseline radar interferometry. (b) Radar wave paths to fixed-baseline antennas for points at different surface elevations.



178 *Chapter 7*

Fig. 7.2 H… depends o… and on sur… possibilitie… perfectly s… (b) for a co… rough surf… natural sur…

Table 7.1 Surface roughness (in cm) relative to radar wavelengths, derived from the Rayleigh criterion.

Roughness	Ka-band (λ = 0.86 cm)	X-band (λ = 3 cm)	L-band (λ = 25 cm)
Smooth	<0.05	<0.17	<1.41
Intermediate	0.05–0.28	0.17–0.96	1.41–8.04
Rough	>0.28	>0.96	>8.04

One that is rough satisfies the criterion:

$$H > \lambda / 4.4 \sin\theta \quad (7.2)$$

The behaviour of radar waves at natural surfaces is complex. Rough surfaces scatter energy diffusely in all directions, whereas surfaces of intermediate roughness combine specular and scattered components (Fig. 7.2d). The tone of a horizontal natural surface on a radar image therefore is a combined result of its roughness and to a much lesser extent of the dielectric constant of the materials from which it is formed.

Quite clearly the Rayleigh criterion implies that radar wavelength helps determine what is rough or smooth. …hows limiting values of the mean height of …gularities associated with different categories …s for three radar wavelengths in common use. …derived using the Rayleigh criterion. Roughness …ds on the angle of incidence of radar waves at … For radar images gathered from aircraft this …roblem. Because the depression angle changes …rom near to far range (Section 3.5), ensuring …enna can record from a wide swath of surface,

Fig. 7.3 The proportion of emitted e… from a surface to the antenna—the ra… coefficient—depends on both the surf… the angle of incidence. Both the depr… the surface slope control the inciden…

It is possible theoretically to e… apparent roughness with incide… detailed information about the r… to select a depression angle that…

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